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EXAMINER	
TIMORY, KABIR A	

ART UNIT	PAPER NUMBER
2611	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/537,068	VAN HOUTUM, WIM	
	Examiner	Art Unit	
	KABIR A. TIMORY	2611	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *15 October 2008*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-21* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-21* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. This office action is in response to the amendment filed on 10/15/2008. Claims 1-21 are pending in this application and have been considered below.

2. The objections to the claims are corrected by the amendment. Therefore, the objection is withdrawn.

3. The rejection under 35 USC 112 2nd paragraph to claims 1-21 is corrected by the amendment. Therefore, the rejection is withdrawn.

4. Applicant's arguments with respect to claims 1 and 12 have been considered but are moot in view of new ground(s) of rejection.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 1-6, 9, 11-14, 19, and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sugar et al. (US 2003/0181165) in view of Shoki et al. (US 6,480,526).

Regarding claim 1:

As shown in figure 1-9 Sugar et al. discloses a data communication system (see figure 1) comprising:

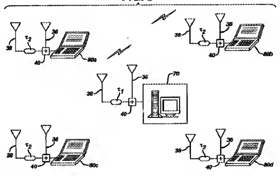
- a transmitter (212 in figure 2) having first and second transmitting antennae, (202, 204 in figure 2), the first antenna exhibiting a different delay than a signal path of the second antenna (par 0038, lines 1-14) ***(also, figure 1 shows that each STA has two receive antennas (Wrx1 and Wrx2) and two transmit antennas (Wtx1 and Wtx2) and the AP has four receive antennas and four transmit antennas, which according to paragraph 0038 "the signal will be sent from each antenna with a different delay spread");*** and
- a receiver (214 in figure 2) having third and fourth (206 and 208 in figure 2) receiving antennae (par 0038, lines 1-14) ***(also, figure 1 shows that each STA has two receive antennas (Wrx1 and Wrx2) and two transmit antennas (Wtx1 and Wtx2) and the AP has four receive antennas and four transmit antennas, which according to paragraph 0038 "the signal will be sent from each antenna with a different delay spread").***

Sugar et al. disclose all of the subject matter as described above except for specifically teaching the third antenna having a signal path exhibiting a different delay than a signal path of the fourth antenna.

However, Shoki et al. in the same field of endeavor teach the third antenna (11 in figure 6) having a signal path exhibiting a different delay (24 in figure 6) than a signal path of the fourth antenna (12 in figure 6) (col 7, lines 36-67, col 8, lines 1-20).

In figure 3 of the instant application the applicant illustrate:

FIG. 3



Also on page 5, lines 24-30 of the specification of the instant application, the applicant discloses: "At a receiving terminal, the signal power P radiated by the transmitting terminal is received by two antennae 36 and 38, each receiving the total power P radiated by both transmitting antennae. The multiple receiving antenna will therefore improve the signal to noise performance of the system since the total power received by both antennae is 2P. <u>There is also a diversity of receive signal paths, as the RF signal path of the receiving antenna 38 of a mobile terminal exhibits a delay of T2 while the receiving antenna 36 exhibits a delay of zero</u>".

In figure 6, Shoki et al illustrates:

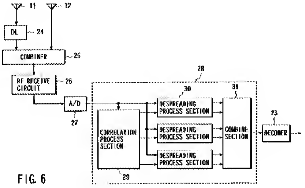


FIG. 6

In figure 6 above, Shoki et al. clearly shows that receive antennas 11 and 12 receive communication signal and the signal which received by antenna 11 is delayed by the delay line 24 then the both delayed and non-delayed signals are combined by the combiner 25. This is the same operation and arrangement as shown figure 3 of the instant application. Therefore, the examiner makes his broadest reasonable interpretation in light of the specification that the third antenna (11 in figure 6) having a signal path exhibiting a different delay (24 in figure 6) than a signal path of the fourth antenna (12 in figure 6).

Thus, it would have been obvious to one ordinary skill in the art at the time the invention was made to use the spread spectrum receive apparatus as taught by Shoki et al. to modify the system and method of Sugar et al. in order to properly combine both signals without any high-precision delay estimation in the RAKE receiver (see col 7, lines 20-250).

Regarding claim 2:

Sugar et al. further discloses wherein a nonzero delay of one of the signal paths of the first and second antennae is different from a nonzero delay of one of the signal paths of the third and forth antennae (par 0038, lines 1-14).

Regarding claim 3:

Sugar et al. further discloses the value of one of the nonzero delay is twice that of the other nonzero delay (see the equation in par 0038, 1-14).

Regarding claim 4:

Sugar et al. further discloses wherein:

- the transmitter (200 in figure 2) further comprises a transceiver (210 in figure 2) which is capable of both transmission (212 in figure 2) and reception (214 in figure 2) at different times by means of the first and second antennae (202-208 in figure 2, par 0038, lines 1-14) ***(the RF section circuit 210 of figure 2 has both Tx and Rx capabilities.. Furthermore, according to par 0033, Sugar et al. disclose: "An RF section 210 is coupled to the antennas 202-208, and includes a transmitter (Tx) 212 and a receiver (Rx) 214". Therefore, the examiner is interpreting that the RF section 210 is the transceiver)***; and
- wherein the receiver ***(In paragraph 0033, Sugar et al. disclose that "FIG. 2 illustrates a block diagram of a STA or AP 200 that can be used for any one of the terminals shown in FIG. 1 ". Therefore the examiner is interpreting that the circuit of figure 2 can be used for both STA and AP of figure 1)*** (200 in figure 2) further comprises a transceiver which is capable of both transmission (212 in figure 2) and reception (214 in figure 2) at different times by means of the third and fourth antennae (202-208 in figure 2) (par 0038, lines 1-14).

Regarding claim 5:

Sugar et al. further discloses wherein the data further comprises voice data (par 0065, lines 18-20).

Regarding claim 6:

Sugar et al. further discloses wherein the data further comprises digital data (ADC in figure 2).

Regarding claim 9:

Sugar et al. further discloses wherein the delays comprise RF delays (The RF section 210 of figure is interpreted to generate RF signal; therefore the delay which is disclosed in paragraph 0038 is interpreted to be RF delay).

Regarding claim 11:

Sugar et al. further discloses wherein the delays comprise baseband delays (The baseband section 220 of figure is interpreted to generate baseband signal; therefore the delay which is disclosed in paragraph 0038 is interpreted to be baseband delay).

Regarding claim 12:

As shown in figure 1-9 Sugar et al. discloses a WLAN system (par 0016, lines 1-6) comprising:

- an access point (110 in figure 1) having a transceiver ***(the RF section circuit 210 of figure 2 has both Tx and Rx capabilities.. Furthermore, according to par 0033, Sugar et al. disclose: "An RF section 210 is coupled to the antennas 202-208, and includes a transmitter (Tx) 212 and a receiver (Rx) 214". Therefore, the examiner is interpreting that the RF section 210 is the transceiver. Also, in paragraph 0033, Sugar et al. disclose that "FIG. 2 illustrates a block diagram of a STA or AP 200 that can be used for any one of the terminals shown in FIG. 1 ". Therefore the examiner is interpreting that the circuit and arrangement of figure 2 can be used for both STA and AP of figure***

1) coupled to first and second transceiving antennae (Wtx1 and Wrx1 of 110 in figure 1),

- the first transceiving antenna having a signal path exhibiting a different delay than a signal path of the second transceiving antenna (par 0038, lines 1-14); and
- one or more mobile terminals (120, 130, 140, 150 in figure 1) each having a transceiver ***(the RF section circuit 210 of figure 2 has both Tx and Rx capabilities.. Furthermore, according to par 0033, Sugar et al. disclose: "An RF section 210 is coupled to the antennas 202-208, and includes a transmitter (Tx) 212 and a receiver (Rx) 214". Therefore, the examiner is interpreting that the RF section 210 is the transceiver. Also, in paragraph 0033, Sugar et al. disclose that "FIG. 2 illustrates a block diagram of a STA or AP 200 that can be used for any one of the terminals shown in FIG. 1 ". Therefore the examiner is interpreting that the circuit and arrangement of figure 2 can be used for both STA and AP of figure 1)*** coupled to third and fourth transceiving antennae (Wtx1, Wtx2 in 120 of figure 1) (par 0038, lines 1-14).

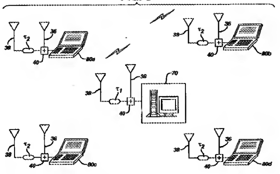
Sugar et al. disclose all of the subject matter as described above except for specifically teaching the signal path of the third transceiving antenna exhibiting a different delay than the signal path of the fourth transceiving antenna.

However, Shoki et al. in the same field of endeavor teach the signal path of the third transceiving antenna (11 in figure 6) exhibiting a different delay (24 in figure 6) than the signal path of the fourth transceiving antenna (12 in figure 6) (col 7, lines 36-67, col 8, lines 1-20). Although, Shoki et al. does not specifically teaches transceiving antennas, however it would have been obvious to one of ordinary skilled in the art to

use the methodology as taught by Shoki et al. to implement it in transceiving antennas in order to provide time diversity for the system.

Moreover, in figure 3 of the instant application the applicant illustrate:

FIG. 3



Also on page 5, lines 24-30 of the specification of the instant application, the applicant discloses: “At a receiving terminal, the signal power P radiated by the transmitting terminal is received by two antennae 36 and 38, each receiving the total power P radiated by both transmitting antennae. The multiple receiving antenna will therefore improve the signal to noise performance of the system since the total power received by both antennae is 2P. <u>There is also a diversity of receive signal paths, as the RF signal path of the receiving antenna 38 of a mobile terminal exhibits a delay of T2 while the receiving antenna 36 exhibits a delay of zero</u>”.

In figure 6, Shoki et al illustrates:

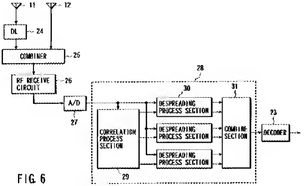


FIG. 6

In figure 6 above, Shoki et al. clearly shows that receive antennas 11 and 12 receive communication signal and the signal which received by antenna 11 is delayed by the delay line 24 then the both delayed and non-delayed signals are combined by the combiner 25. This is the same operation and arrangement as shown figure 3 of the instant application. Therefore, the examiner makes his broadest reasonable interpretation in light of the specification that the third antenna (11 in figure 6) having a signal path exhibiting a different delay (24 in figure 6) than a signal path of the fourth antenna (12 in figure 6).

Thus, it would have been obvious to one ordinary skill in the art at the time the invention was made to use the spread spectrum receive apparatus as taught by Shoki et al. to modify the system and method of Sugar et al. in order to properly combine both signals without any high-precision delay estimation in the RAKE receiver (see col 7, lines 20-250).

Regarding claim 13:

Sugar et al. further discloses a nonzero delay of one of the signal paths of the first and second transceiving antennae is different from a nonzero delay of one of the signal path of the third and fourth transceiving antennae (par 0038, lines 1-14).

Regarding claim 14:

Sugar et al. further discloses the value of one of the nonzero delay is twice that of the other nonzero delay (see the equation in par 0038, 1-14).

Regarding claim 19:

Sugar et al. further discloses wherein the delays comprise RF delays (The RF section 210 of figure is interpreted to generate RF signal; therefore the delay which is disclosed in paragraph 0038 is interpreted to be RF delay).

Regarding claim 21:

Sugar et al. further discloses wherein the delays comprise baseband delays (The baseband section 220 of figure is interpreted to generate baseband signal; therefore the delay which is disclosed in paragraph 0038 is interpreted to be baseband delay).

7. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sugar et al. in view of Shoki et al. as applied to claim 1 above and further in view of Wallace et al. (US 2002/0193146).

Regarding claim 7:

Sugar et al. disclose all of the subject matter as described above except for specifically teaching wherein the signal path of the first antenna comprises an RF delay element and an RF adder and the signal path of the second antenna comprises an RF

adder; and wherein the signal path of the third antenna comprises an RF delay dement and an RE adder and the signal path of the fourth antenna comprises an RF adder.

However, Shoki et al. in the same field of endeavor teach wherein the signal path of the third antenna (11 in figure 6) comprises an RF delay dement (24 in figure 6) and an RE adder (25 in figure 6) and the signal path of the fourth antenna (12 in figure 6) comprises an RF adder (25 in figure 6) (col 7, lines 36-67, col 8, lines 1-20). Therefore, it would have been obvious to one ordinary skill in the art at the time the invention was made to use the spread spectrum receive apparatus as taught by Shoki et al. to modify the system and method of Sugar et al. in order to properly combine both signals without any high-precision delay estimation in the RAKE receiver (see col 7, lines 20-250.

Sugar et al. and Shoki et al. disclose all of the subject matter as described above except for specifically teaching wherein the signal path of the first antenna comprises an RF delay element and an RF adder and the signal path of the second antenna comprises an RF adder.

However, Wallace et al. in the same field of endeavor teach wherein the signal path of the first antenna (1008 in figure 19) comprises an RF delay element (1004 in figure 19) and an RF adder (1002 in figure 19) and the signal path of the second antenna (1010 in figure 19) comprises an RF adder (1006 in figure 19) (par 0129-0136). Therefore, it would have been obvious to one ordinary skill in the art at the time the invention was made to use the mixed system (MIMO and SISO) as taught by Wallace et al. to modify the system and method of Sugar et al. in order to provide spatial diversity for the communication system (see par 0129).

8. Claims 8, 10, 16, 17, 18, and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sugar et al. in view of Joo et al. (US 2003/0095533).

Regarding claim 8

Sugar et al. discloses all of the subject matter as described above except for specifically teaching wherein the transmitter further comprises at least one or more of a coder and a guard interval insertion processor; and wherein the receiver further comprises at least one or more of a decoder responsive to codes utilized by the coder and a guard interval recognition processor.

However Joo et al. in the same field of endeavor teaches wherein the transmitter further comprises at least one or more of a coder (encoder is interpreted to be a coder) (paragraph 0008, lines 1-3) and a guard interval insertion processor (figure 2, 230, 240, paragraph 0008, lines 18-21); and wherein the receiver further comprises at least one or more of a decoder (paragraph 0063, lines 1-4) responsive to codes utilized by the coder and a guard interval recognition processor (figure 2, 230, 240, paragraph 0008, lines 18-21).

One of ordinary skill in the art would have clearly recognized that in a data wireless communication network system an encoder (coder) and decoders are used in transmit/receive device to generate bit stream or data in a code format. Also, along with encoder, guard interval is used to ensure distinct transmissions do not interfere with one another. Furthermore, it is used to reduce propagation delays in a multipath environment. To reduce the effect of multipath interference, it would have been obvious

to one of ordinary skill in the art at the time the invention was made to use the diversity technique which is the use of two transceivers and the use of encoder and guard interval as taught by Joo in designing wireless network. In doing so, the diversity technique ensures if one transceiver is in radio frequency (RF) null the other is not. Furthermore, it enhances the performance of the system in high interference areas such as multipath environment.

Regarding claims 10 and 20:

Sugar et al. discloses all of the subject matter as described above except for specifically teaching wherein the delays comprise IF delays.

However Joo et al. in the same field of endeavor teaches wherein the delays comprise IF delays (paragraph 0016, lines 5-9).

One of ordinary skill in the art would have clearly recognized that when the signals are transmitted from a transmitter due to the multipath phenomenon, it would experience delays in phase and amplitude. These delays are called RF delays. When the RF signal are received by the transceivers, they are converted into IF frequency signals. This will cause some IF delays in the system. To overcome these delays, antenna diversity and the use of encoders/decoder and guard interval are. To reduce the interference and delays in a multipath environment, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the diversity technique which is the use of two transceivers and the use of encoder and guard interval as taught by Joo in designing wireless network such as WLAN. In doing so, the diversity technique ensures if one transceiver is in radio frequency (RF) null the other is

not. Also, it will reduce the IF delay in the system. Furthermore, it enhances the performance of the system in high interference areas such as multipath environment.

Regarding claim 16:

Sugar et al. discloses all of the subject matter as described above except for specifically teaching wherein each transceiver further comprises an OFDM system.

However Joo et al. in the same field of endeavor teaches wherein each transceiver further comprises an OFDM system (paragraph 0005, lines 1-2).

One of ordinary skill in the art would have clearly recognized when radio frequency (RF) signals are transmitted over a wireless channel, due to the obstacle such as walls, buildings, trees and etc, the RF signal would take different paths from the source to get to the destination. As a result, the signal experience delays in phase, amplitude and time. To reduce the multipath interference in wireless communication system, and to increase the probability of receiving better signals, diversity technique is used in wireless communication system. Diversity technique is the use of two or more antennas for receiving and transmitting RF signals. These antennas are capable of both transmission (receive and transmit) and are called transceiver. To reduce further the effect of multipath interference, OFDM technique is used in the transceiving device. The diversity technique in an OFDM transceiving device will ensure the probability of receiving better signal. To reduce the effect of multipath interference, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use diversity and OFDM techniques as taught by Joo et al. to overcome multipath interference in the network. Antenna diversity and OFDM techniques will increase the

probability of receiving better signals from the source to the distention. Also it will improve the performance of the network.

Regarding claim 17:

Sugar et al. discloses all of the subject matter as described above except for specifically teaching wherein the OFDM system utilizes one of binary phase shift keying (BPSK), quadrature phase shift keying (QPSK), 16- quadrature amplitude modulation (16-QAM) or 64-QAM.

However Joo et al. in the same field of endeavor teaches the WLAN system (paragraph 0006, line 22) and the OFDM system (paragraph 0005, lines 1-2) utilizes one of binary phase shift keying (BPSK), quadrature phase shift keying (QPSK), 16-quadrature amplitude modulation (16-QAM) or 64-QAM (paragraph 0008, lines 9-13).

One of ordinary skill in the art would have clearly recognized when using WLAN for transmitting extremely high-speed data, the OFDM modulation technique is used. This technique allows the high-speed transmission to occur over multiple frequency channels. Also, OFDM modulation further modulates the signal using other modulation techniques such as QPSK, BPSK, 16-QAM and 64-QAM. Using one of these modulations along with antenna diversity techniques will reduce the effect of the multipath interference and delays the system. To increase the probability of receiving better signal, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the antenna diversity and OFDM, QPSK, BPSK, 16-QAM and 64-QAM modulation techniques as taught by Joo et al. to overcome multipath interference in the network. Antenna diversity and OFDM techniques will increase the

probability of receiving better signals from the source to the distention. Also it will improve the performance of the network.

Regarding claim 18:

Sugar et al. discloses all of the subject matter as described above except for specifically teaching wherein each transceiver further comprises at least one or more of a coder and a guard interval insertion processor; and at least one or more of a decoder responsive to codes utilized by the coder and a guard interval recognition processor.

However, Joo et al. in the same field of endeavor teaches at least one or more of a coder and a guard interval insertion processor (encoder is interpreted to be a coder) (paragraph 0008, lines 1-3); and at least one or more of a decoder responsive to codes utilized by the coder (paragraph 0063, lines 1-4) and a guard interval recognition processor (figure 2, 230, 240, paragraph 0008, lines 18-21).

One of ordinary skill in the art would have clearly recognized that in a data wireless communication network system such as WLAN an encoder (coder) and decoders are used in transmit/receive device to generate bit stream or data in a code format. Also, along with encoder, guard interval is used to ensure distinct transmissions do not interfere with one another. It is used to reduce propagation delays in a multipath environment. To reduce the effect of multipath interference, the it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the diversity technique which is the use of two transceivers and the use of encoder and guard interval as taught by Joo in designing wireless network. In doing so, the diversity technique ensures if one transceiver is in radio frequency (RF) null the other is not.

Furthermore, it enhances the performance of the system in high interference areas such as multipath environment.

9. Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sugar et al. in view of Thompson et al. (IEEE Proc.-Commun., Vil. 147, No.6, December 2000) and further in view of Krishnamurthy et al. (0-7803-3002-1/95 $4.00(c) 1995 IEEE).

Regarding claim 15:

Sugar et al. discloses all of the subject matter as described above except for specifically teaching multiple antennas and different delays provide an (LL) diversity exhibiting 2L diversity plus 10log10(L) dB performance.

However Thompson et al. in the same field of endeavor, teaches multiple antennas and different delays provide an (LL) diversity exhibiting 2L diversity (column 7, lines 6-13).

Sugar et al. and Thompson et al. disclose all of the subject matter as described above except for specifically teaching diversity plus 10log10(L) dB performance.

However Krishnamurthy et al. in the same field of endeavor diversity plus 10log10(L) dB performance (column 6, lines 7-8).

One of ordinary skill in the art would have clearly recognized that when two or more diversity antennas are used in the system, the delay diversity method is applied to

the transmitted signals. In this method the time delay of L code is applied to the signal of the second antenna to generate an artificial multipath signal for 2L plus 10log10(L) dB performance. Also, using this method will provide 2L diversity. To reduce the effect of multipath interference, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the diversity technique, which is the use of two transceivers in designing wireless network. Also as taught by Thompson and Krishnamurthy, using the delay diversity method would reduce the multipath effect in the system. The diversity technique ensures if one transceiver is in radio frequency (RF) null the other is not. Furthermore, it enhances the performance of the system in high interference areas such as multipath environment.

Conclusion

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to KABIR A. TIMORY whose telephone number is (571)270-1674. The examiner can normally be reached on 6:30 AM - 3:00 PM Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Shuwang Liu can be reached on 571-272-3036. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for

published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Kabir A Timory/
Examiner, Art Unit 2611
/Shuwang Liu/
Supervisory Patent Examiner, Art Unit 2611